

Express Mail No. EL856995132US  
Attorney Docket No. 5437.05

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re: Application of

Inventor: John A. Doherty; Charles A. Kalbfleisch

Appl. No.: \_\_\_\_\_

Group Art Unit: \_\_\_\_\_

Filed: May 21, 2001

Examiner: \_\_\_\_\_

Title: APPARATUS AND SYSTEM FOR SYNCHRONIZED APPLICATION OF  
ONE OR MORE MATERIALS TO A SURFACE FROM A VEHICLE  
AND CONTROL OF A VEHICLE MOUNTED VARIABLE POSITION  
SNOW REMOVAL DEVICE

Box: Patent Application  
Commissioner for Patents  
Washington, D.C. 20231

Express Mailing label number EL856995132US

Date of Deposit: May 21, 2001

I hereby certify that this paper or fee is being deposited with the United States Postal Service "express Mail Post Office to Addressee" service under 37 CFR 1.10 on the date indicated above and is addressed to the Commissioner for Patents, Washington, D.C. 20231.

Name: Jang Lalis

Signature: *Jang Lalis*

**PRELIMINARY AMENDMENT**

Dear Sir:

Please enter this Preliminary Amendment in the continuation application filed herewith based on application Serial No. 09/643,154 filed August 21, 2001.

IN THE CLAIMS:

Please cancel claims 1-11.

Please add the following new claims 12-41:

12. A remote-controlled material distribution apparatus carried on a vehicle having a spreader system having at least one container for carrying at least one material therein for

distributing the at least one material on a travel surface across a width thereof, the remote-controlled material distribution apparatus comprising:

5                   a control unit on board the vehicle in communication with the spreader system and with a remote computer, the control unit controlling the distribution of the at least one material on the vehicle travel surface and configured to receive at least one control signal from the remote computer.

13.     The apparatus of claim 12 wherein upon receipt of the at least one control signal, the control unit communicates with the spreader system to distribute the at least one material on the travel surface.

14.     The apparatus of claim 13 wherein the control signal includes a quantity of material control signal for controlling the quantity of material distributed on the travel surface.

15.     The apparatus of claim 13 wherein the control signal includes a width control signal for controlling the width of the travel surface covered by the material distributed on the travel surface.

16.     The apparatus of claim 13 wherein the control signal includes a direction control signal for controlling the direction of distribution of the material distributed on the travel surface.

17.     The apparatus of claim 13 wherein the travel surface includes one of a road, a runway, and an agricultural field.

18.     The apparatus of claim 13 wherein the vehicle includes a transmitter for transmitting a location of the vehicle to the remote computer.

19.     The apparatus of claim 18 wherein the at least one control signal from the remote computer is a function of the location of the vehicle.

20.     The apparatus of claim 18 wherein the transmitter transmits global positioning system coordinates to the remote computer.

21.     The apparatus of claim 13 wherein the control signal includes a level of service control signal.

22.     The apparatus of claim 13 including a second container for carrying a second material.

23.     The apparatus of claim 22 wherein the control signal includes a type of material signal for controlling the distribution of at least one of the at least one material and the second material.

24. The apparatus of claim 22 wherein the control signal includes a level of service control signal.

25. A remote-controlled snow removal apparatus mounted on a vehicle in communication with a remote computer comprising:

a control unit on board the vehicle in operable communication with the snow removal apparatus and the remote computer for controlling an orientation of the snow removal apparatus, wherein the control unit is configured to receive at least one control signal from the remote computer.

26. The remote controlled snow removal apparatus of claim 25 wherein the snow removal apparatus includes a snow plow mounted on the vehicle for side discharge of snow to a side of the vehicle, the plow being moveable between a lowered plowing position and a raised non-snowplowing position, the at least one control signal directing movement of the plow between the lowered and raised position.

27. The remote controlled snow removal apparatus of claim 26 wherein the snow removal apparatus includes a side discharge blocking plate moveable between a raised position to permit side discharge of snow and a lowered position to prevent side discharge of snow.

28. The remote controlled snow removal apparatus of claim 26, the plow being moveable between a left side plowing position and a right side plowing position, the at least one control signal directing movement of the snow plow between the left side plowing position and the right side plowing position.

29. A material distribution apparatus for controlling distribution of a material on a travel surface adapted to be mounted on a vehicle carrying a spreader system having at least one container carrying the at least one material therein, the material distribution apparatus comprising:

a control unit adapted to be carried on the vehicle, the control unit being in communication with the spreader system and controlling the distribution of the at least one material on the vehicle travel surface;

a global positioning system receiver in communication with the control unit; and

wherein the control unit controls distribution of the at least one material from the spreader system as a function of the location of the vehicle.

30. The apparatus of claim 29 wherein the control unit is configured to control a quantity of material distributed on the travel surface as a function of the location of the vehicle.

31. The apparatus of claim 29 wherein the control unit is configured to control the width of the material distributed on the travel surface as a function of the location of the vehicle.

32. The apparatus of claim 29 wherein the control unit is configured to control the direction of the material distributed on the travel surface as a function of the location of the vehicle.

33. The apparatus of claim 29 wherein the travel surface is one of a road, a runway, and an agricultural field.

34. The apparatus of claim 29 wherein the control unit is configured to control the distribution of the material distributed on the travel surface as a function of a level of service control signal.

35. A material distribution apparatus for distributing at least one material on a travel surface adapted to be mounted on a vehicle having a spreader system coupled with at least one container for carrying the at least one material therein, the material distribution apparatus comprising:

5 a control unit adapted to be carried on board the vehicle in communication with the spreader system, the control unit controlling the distribution of the at least one material on the vehicle travel surface; and

the control unit having at least one user actuatable control thereon for setting a level of service and configured to control the distribution of the at least one material from the spreader system as a function of the level of service.

36. A synchronized material spreading apparatus comprising:

a vehicle carrying at least a first material capable of being applied to a vehicle travel surface, said first material being carried in a container;

5 a first material application device supported on the vehicle and communicating with the material in the container;

a second material in a second container on the vehicle and a second material application device communicating with the second material for applying the second material to the vehicle travel surface;

at least one control unit on board the vehicle in communication with the first  
10 material application device and the second material application device;

a global positioning system receiver in communication with the control unit for  
determining the location the vehicle and transmitting the location of the vehicle to the control  
unit; and

15 wherein the control unit is configured to control the distribution of at least one of  
the materials as a function of the location of the vehicle.

37. From a vehicle having a spreader system having at least one container for  
carrying at least one material therein, a method of distributing the at least one material on a travel  
surface comprising:

5 receiving an indication of a location of the vehicle from a global positioning  
system in communication with the vehicle;

transmitting a distribution control signal to the spreader system wherein the  
distribution control signal is a function of the received indication of the location of the vehicle;  
and

10 distributing the at least one material from the spreader system to the travel  
surface.

38. The method of claim 37 wherein the control signal includes a quantity of material  
control signal for controlling the quantity of material distributed on the travel surface.

39. The method of claim 37 wherein the control signal includes a width control signal  
for controlling the width of the material distributed on the travel surface.

40. The method of claim 37 wherein the control signal includes a direction control  
signal for controlling the direction of the material distributed on the travel surface.

41. The method of claim 37 wherein the travel surface includes a road, a runway, and  
an agricultural field.

#### IN THE DRAWINGS:

Please replace the 10 sheets of drawings as originally filed with the enclosed 10 sheets of  
formal drawings.

IN THE ABSTRACT:

Please replace the originally filed Abstract with the enclosed substitute Abstract of the Disclosure.

**REMARKS**

New claims 12-41 as presented herein are believed allowable and such indication is respectfully requested.

The proper filing fee is believed enclosed with this Amendment, however, should an additional fee be required, please consider this to be petition therefore, and charge Deposit Account 04-1415.

Dated this 21<sup>st</sup> day of May, 2001.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Greg R. Durbin", written over a horizontal line.

Gregory R. Durbin, Reg. No. 42,503  
USPTO Customer No. 20686

[illegible]

An apparatus and system, preferably mounted on a service vehicle, provides synchronized application of fluid materials, either solid or liquid, to a vehicle travel surface in proportional amounts or spatially distributed proportions in response to user defined requirements and/or operation of a vehicle mounted component in response to conditions encountered in real time. A first embodiment is a vehicle mounted apparatus and system for coordinated application of a plurality of materials to a surface simultaneously and in desired proportions and/or widths automatically and/or selectively. A second embodiment includes a granular material distribution device and includes a plurality of liquid spray headers and pumping means. A third embodiment of the present invention is a vehicle mounted apparatus and system for automated coordinated application of a plurality of materials to a surface as well as automated component control such as blade blocking plate control based on sensed current surface condition information and current accurate location information as well as past operating history and predicted near term weather conditions.

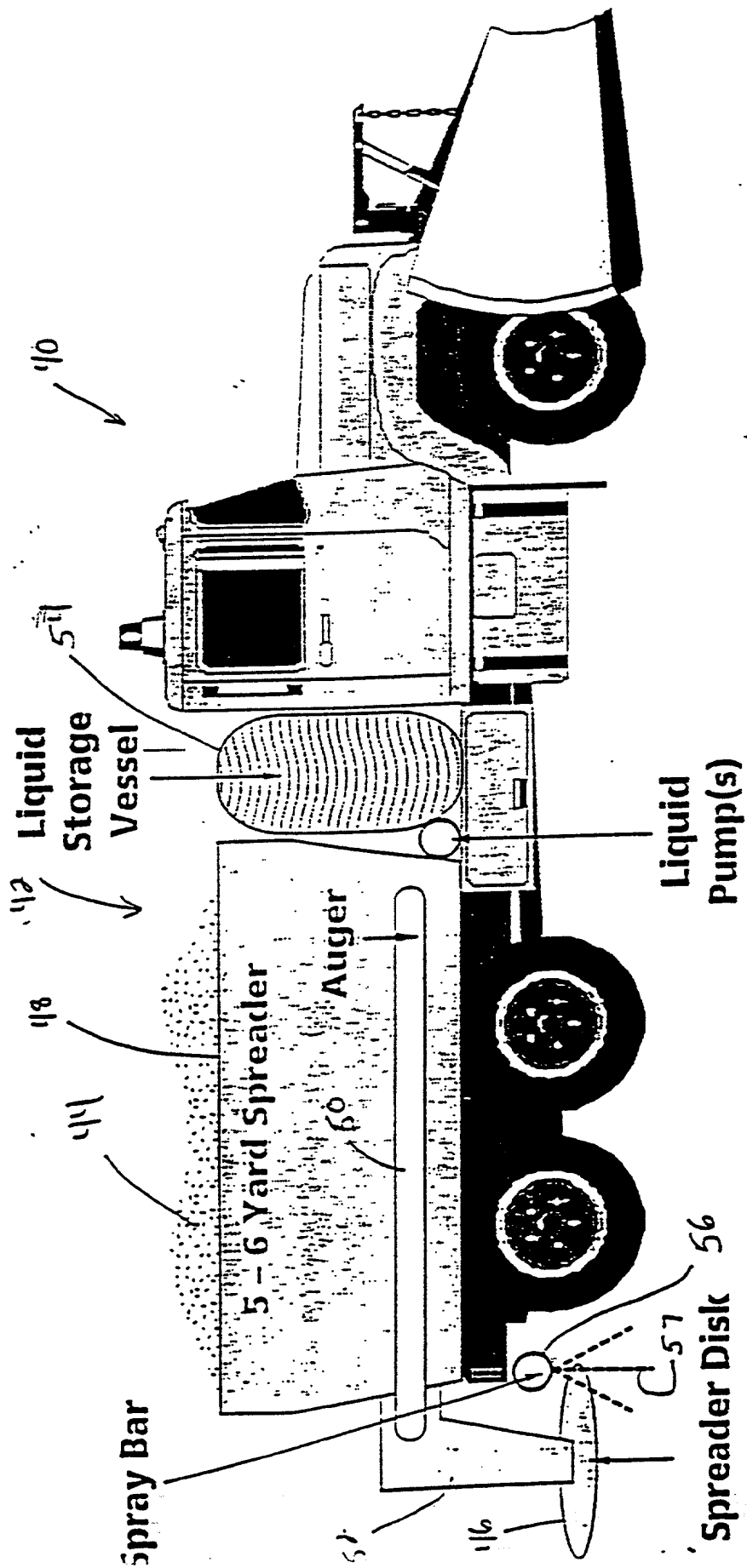


Fig. 1



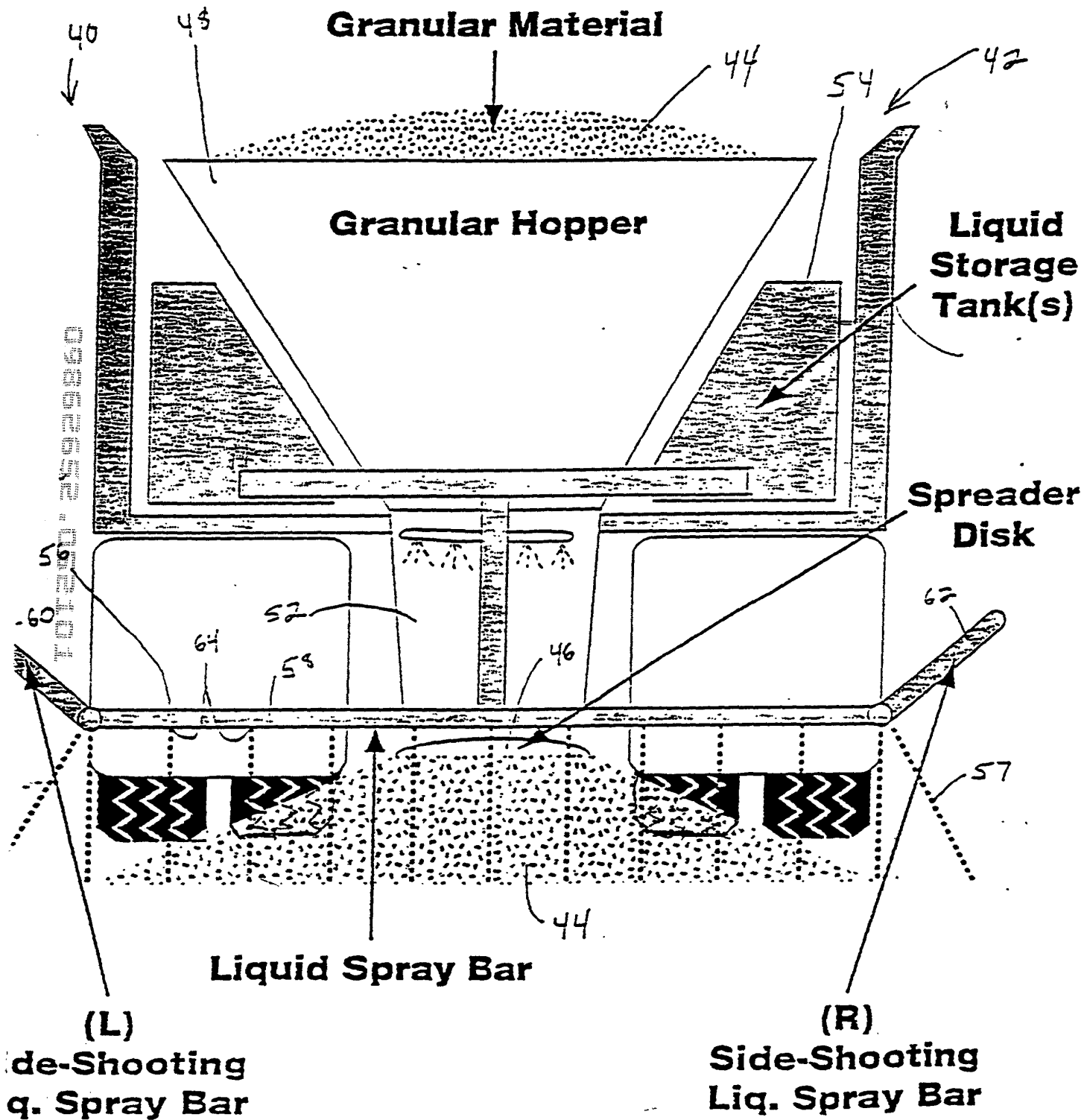


Fig. 2

# Control Box 350

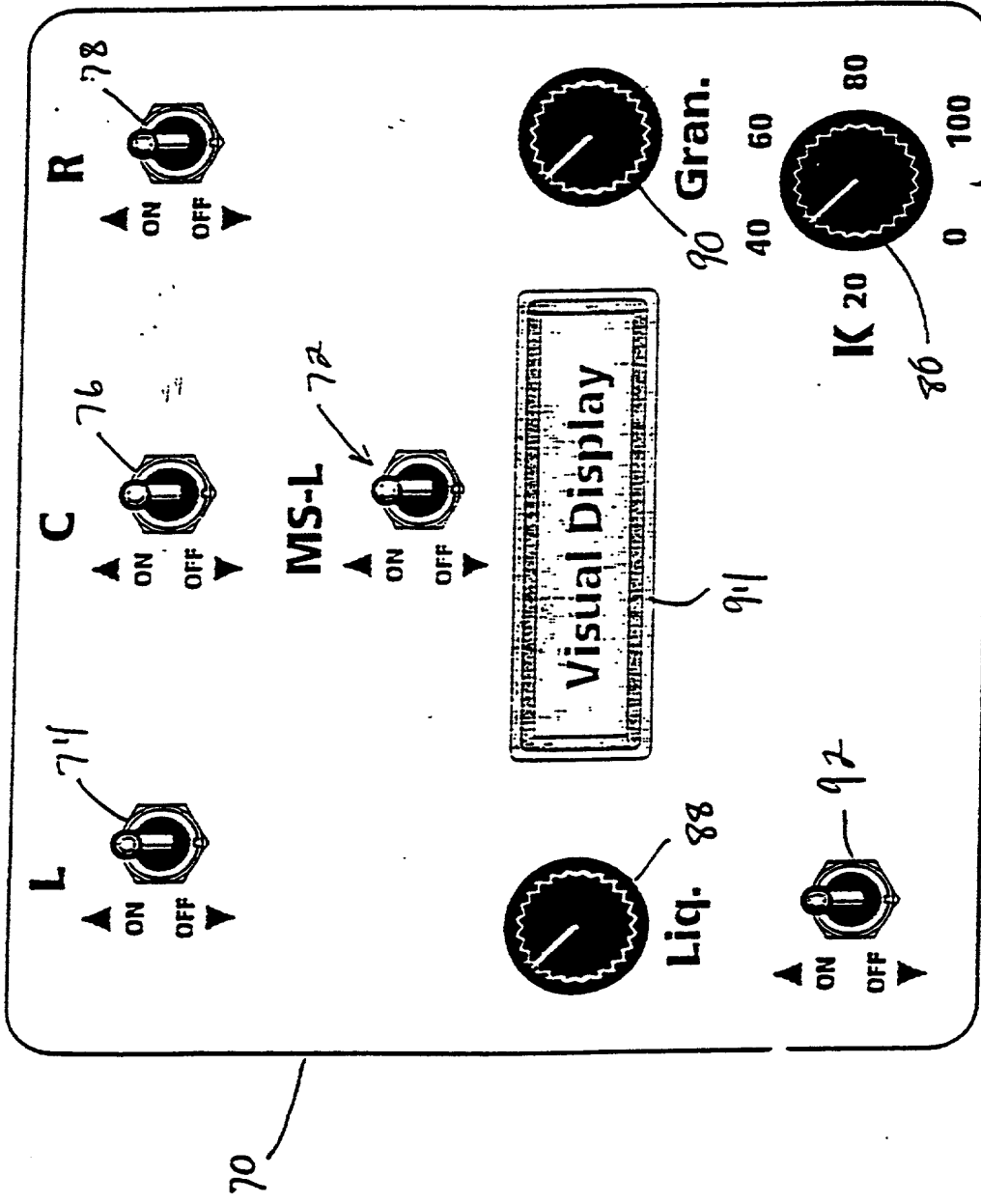
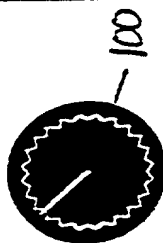


Fig. 3



QL



QG



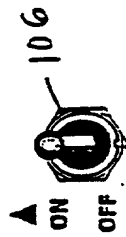
Liquid Left



Liquid Center



Liquid Right



Granular Left



Granular Center



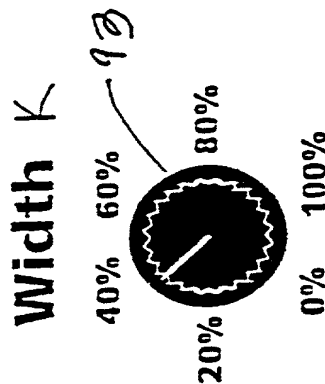
Granular Right



Inhibit Left



Inhibit Right



Software sequence could also be employed.

Fig. 4

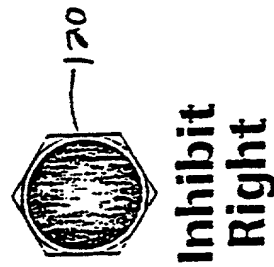
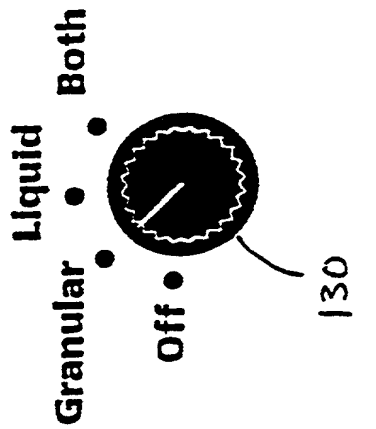
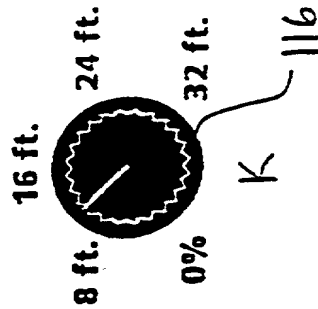
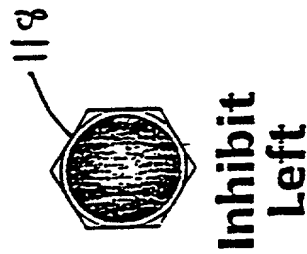
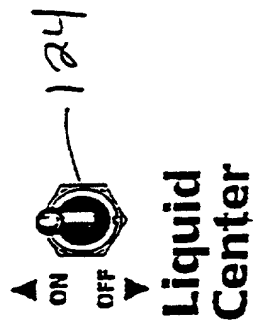
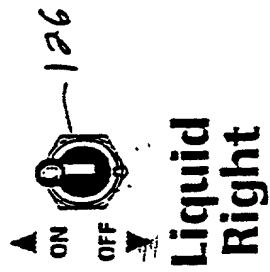
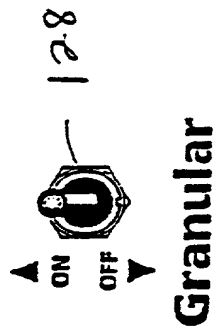
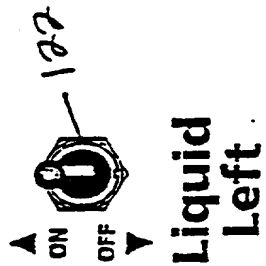
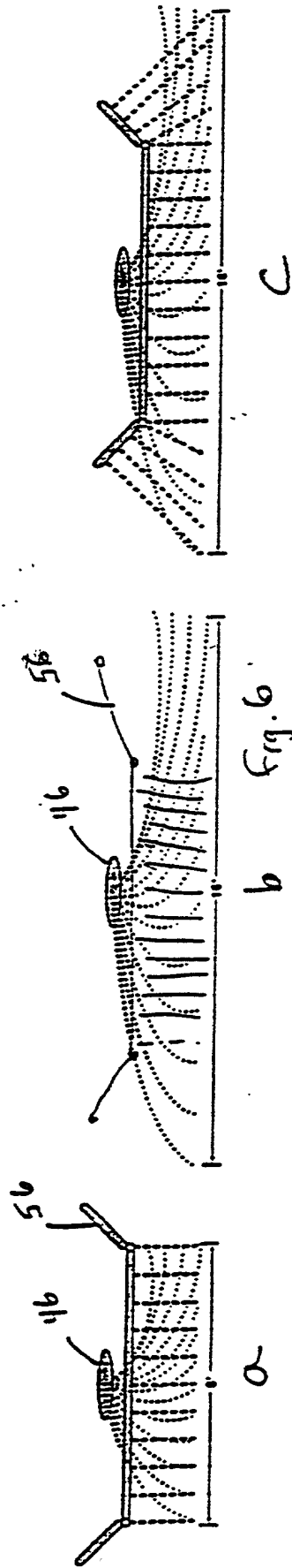


Fig. 5

L Begin R

L Change R

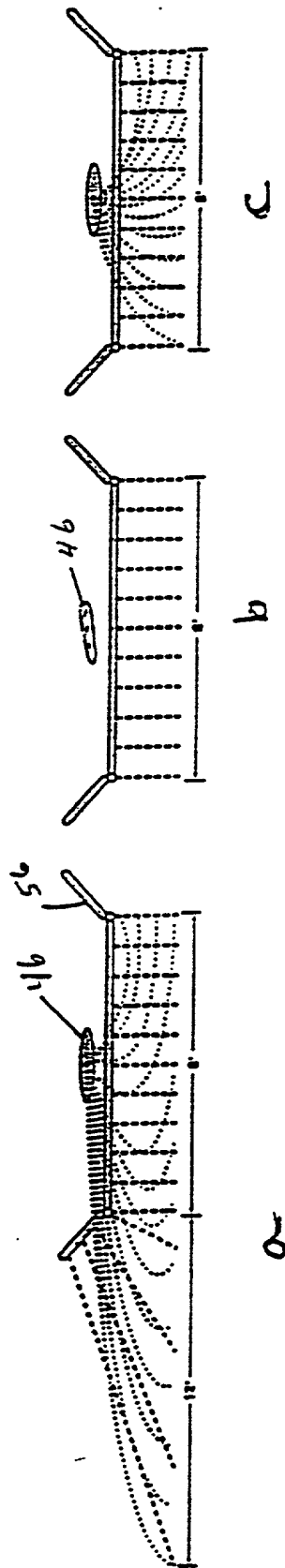
L End R



L Begin R

L Change R

L End R



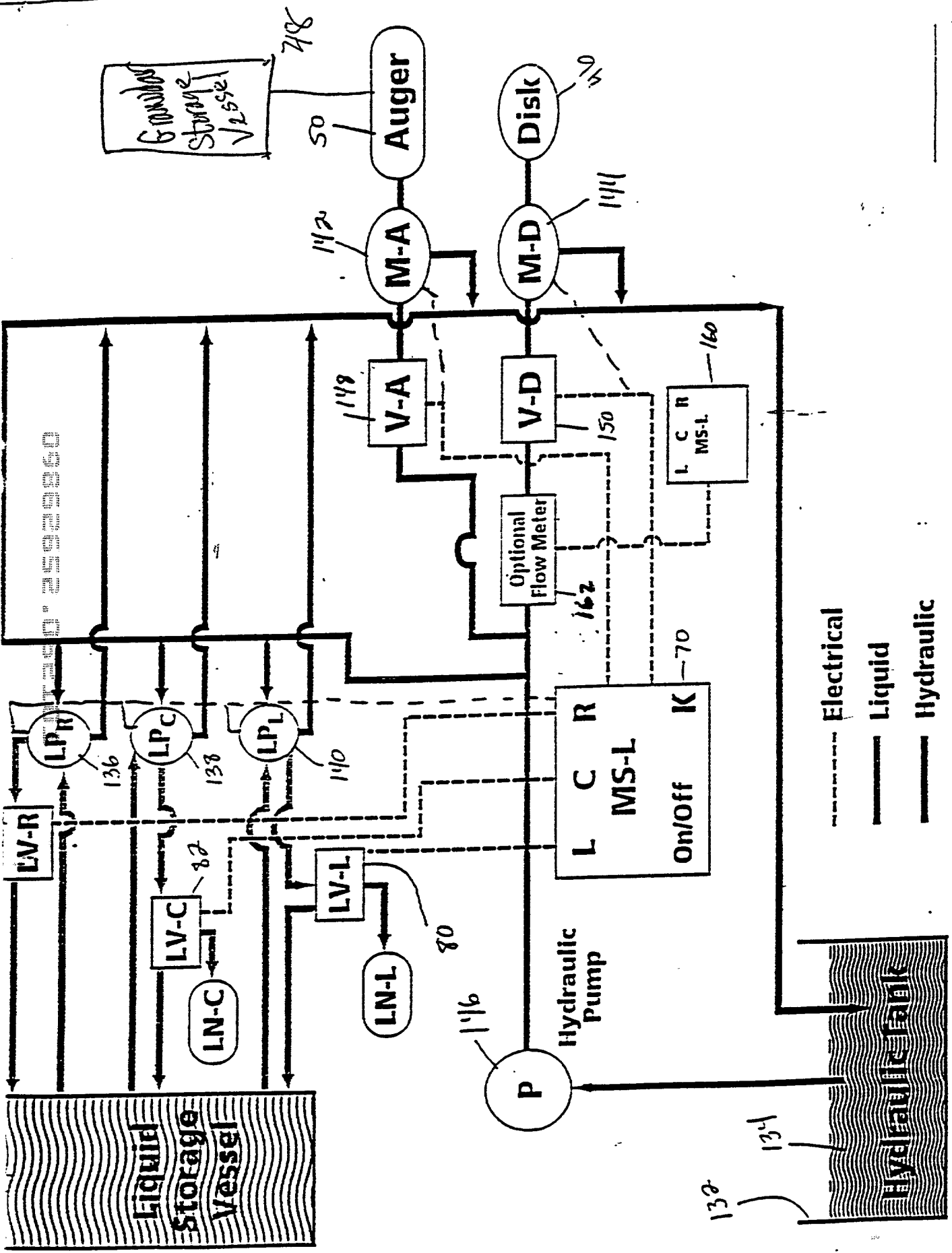


Fig. 8

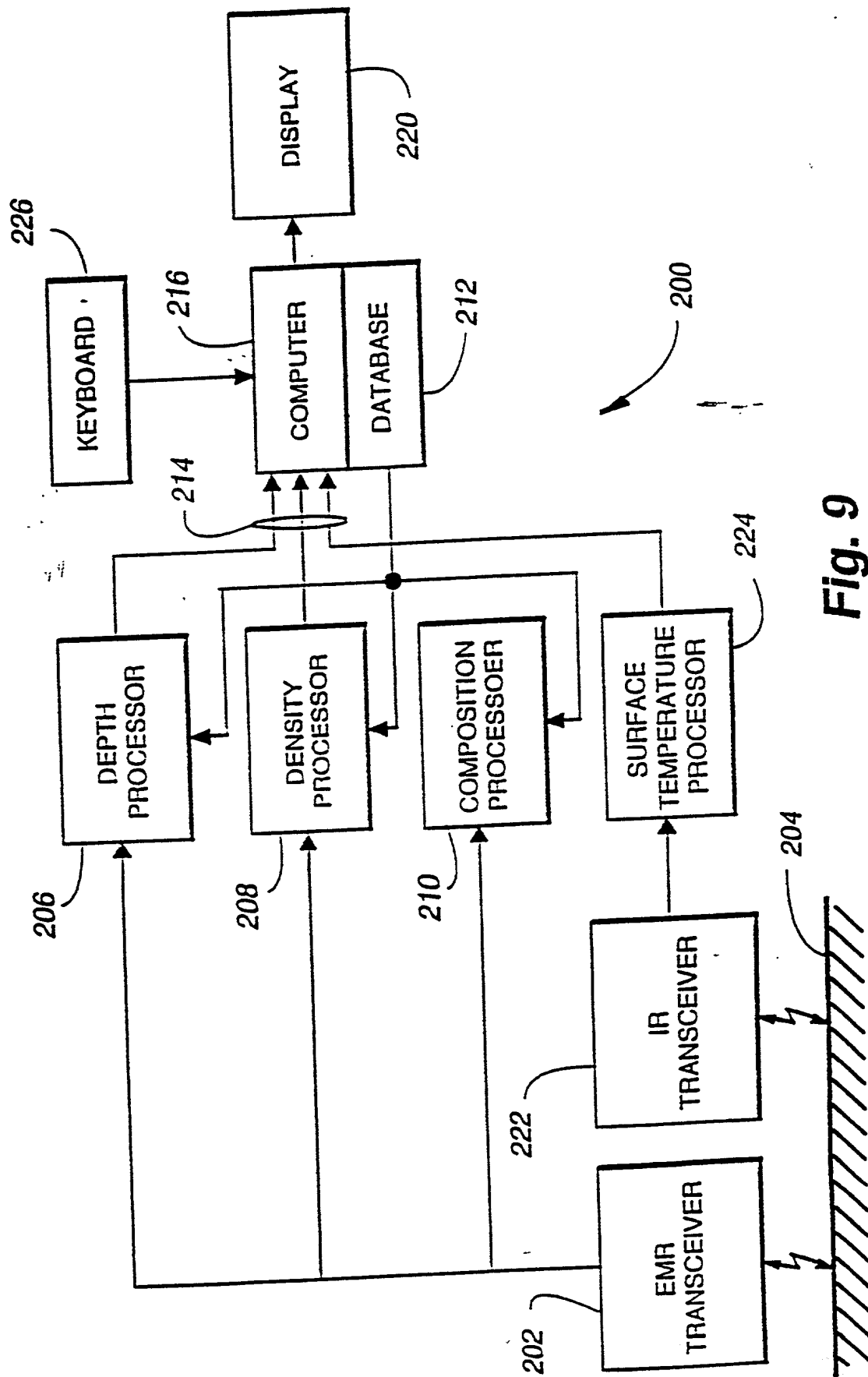


Fig. 9

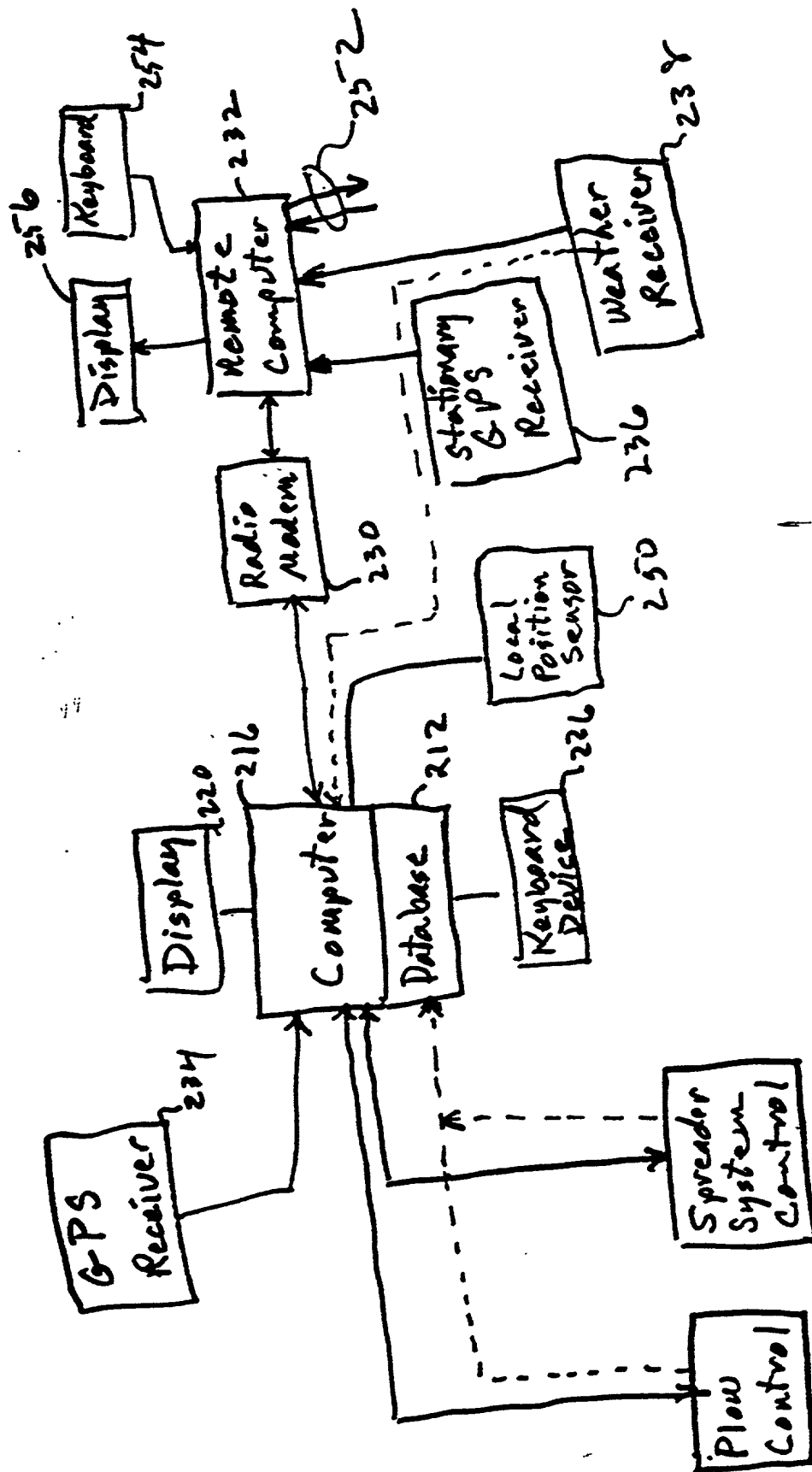


Fig-10



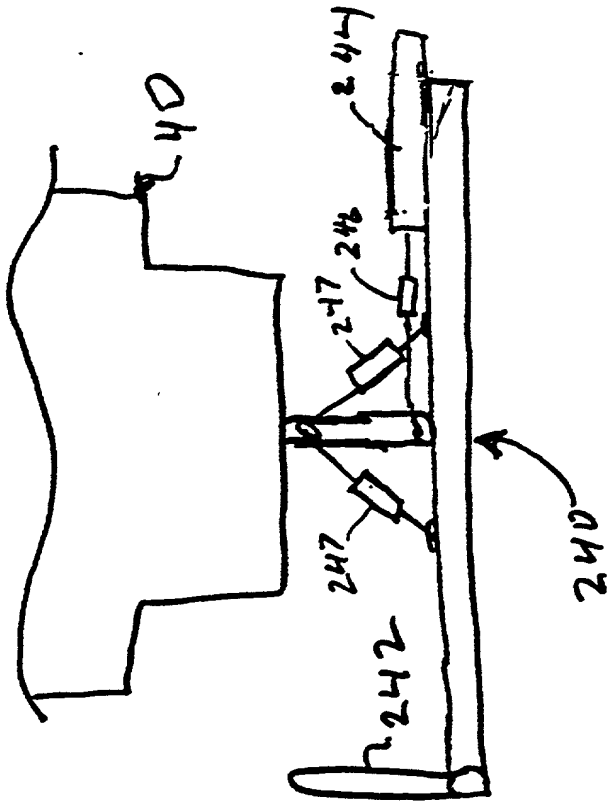


Fig. 11

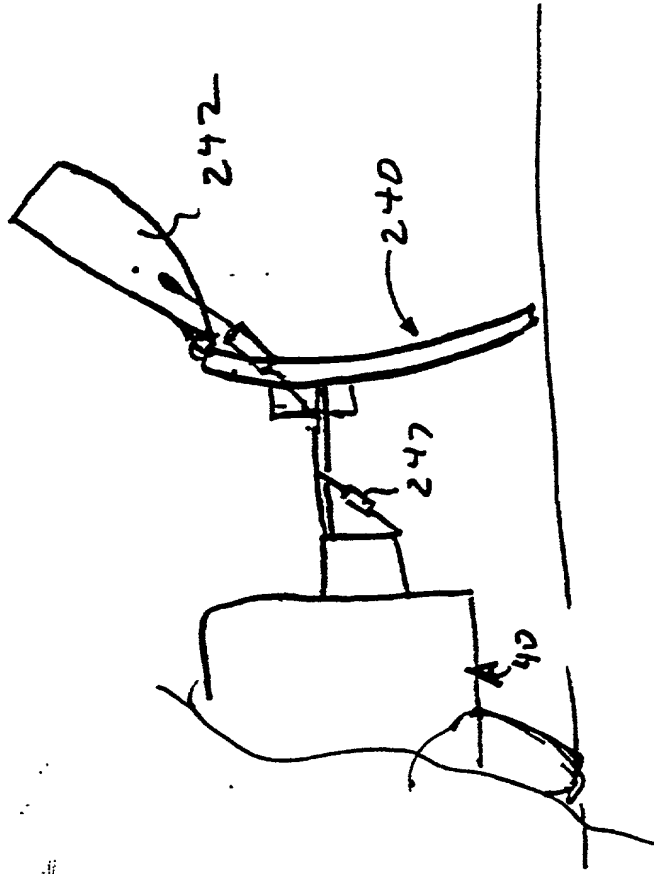


Fig. 12